Text Solutions pg. 189—197, #3, 7, 9, 11, 13

3. Residuals.

a) The scattered residuals plot indicates an appropriate linear model.

b) The curved pattern in the residuals plot indicates that the linear model is not appropriate. The relationship is not linear.

c) The fanned pattern indicates that the linear model is not appropriate. The models predicting power decreases as the values of the explanatory variable increase.

7. Real estate.

a) The explanatory variable (x) is size, measured in square feet, and the response variable (y) is price measured in thousands of dollars.

b) The units of the slope are thousands of dollars per square foot.

c) The slope of the regression line predicting price from size should be positive. Bigger homes are expected to cost more.

9. Real estate again.

71.4% of the variability in price can be explained by variability in size. (In other words, 71.4% of the variability in price can be explained by the linear model.)

11. Real estate redux.

a) The correlation between size and price is $r = \sqrt{R^2} = \sqrt{0.714} = 0.845$. The positive value of the square root is used, since the relationship is believed to be positive.

b) The price of a home that is one standard deviation above the mean size would be predicted to be 0.845 standard deviations (in other words r standard deviations) above the mean price.

c) The price of a home that is two standard deviations below the mean size would be predicted to be 1.69 (or 2×0.845) standard deviations below the mean price.

13. More real estate.

a) According to the linear model, the price of a home is expected to increase \$61 (0.061 thousand dollars) for each additional square-foot in size.

b)

$\hat{Price} = 47.82 + 0.061(Sqrft)$

$\hat{Price} = 47.82 + 0.061(3000)$

$\hat{Price} = 230.82$

According to the linear model, a 3000 square-foot home is expected to have a price of \$230,820.

c)

$\hat{Price} = 47.82 + 0.061(Sqrft)$

$\hat{Price} = 47.82 + 0.061(1200)$

$\hat{Price} = 121.02$

According to the linear model, a 1200 square-foot home is expected to have a price of \$121,020. The asking price is \$121,020 - \$6000 = \$115,020. \$6000 is the (negative) residual.